

**What Did the Rising Tide Lift at the Turn of the Millennium?**

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## *1. Introduction*

A long studied issue in labor economics and macroeconomics is how economic growth affects outcomes for workers and families. In earlier work (Hines, Hoynes, and Krueger 2001), we took a comprehensive look at this issue by examining the impacts of U.S. business cycle conditions on employment, hours and earnings; wage growth; health and work injuries; and government finances. We found that aggregate employment and hours worked are strongly procyclical, particularly for low-skilled workers, while aggregate real wages are only mildly procyclical. Further, economic upturns increase the likelihood that workers acquire jobs in sectors with positively sloped career ladders. Spending by state and local governments in all categories rises during economic expansions, including welfare spending, for which needs vary countercyclically. Since the disadvantaged are likely to benefit disproportionately from such government spending, it follows that the public finances also contribute to conveying the benefits of a strong economy to diverse population groups.

This earlier work used data through the peak of the 1990s expansion. In this paper, we update and extend our earlier work using data through the 2001 recession and subsequent jobless recovery. We use data from the Current Population Survey spanning the years 1976-2003 and examine how U.S. business cycles affect employment, hours, earnings and income. Our main sample consists of mean labor market outcomes for cells defined by metropolitan statistical area (MSA), year and demographic group. There are sixteen demographic groups defined by race (nonblack, black), gender, and years of education (<12, 12, 13-15, 16+). In our basic model, we estimate a first differenced *wage-curve* specification and regress the year-to-year change in the

mean labor market outcome for this MSA-year-demographic cell on the year-to-year change in the unemployment rate for the MSA in that year, and fixed effects for MSA, year, and demographic cell. Identification comes from variation in the timing and severity of recessions across MSA's.

Our results show a strong procyclical pattern of employment and work hours with a more mildly procyclical pattern for real wages. Consistent with previous evidence, less skilled workers (measured here by educational attainment) are more sensitive to business cycle fluctuations—with labor market outcomes rising more in good times and falling more in bad times—compared to higher skilled workers. We also find important differences across race and gender—white females are the least sensitive and black males the most sensitive to business cycle fluctuations. We find some evidence of asymmetry over the cycle: the harmful effect of a one percentage point increase in unemployment during a downturn exceeds the helpful effect of a decline of equal magnitude during an upturn. If we break up the period into the four decades (1970s, 1980s, 1990s, 2000s), the recent period is the most sensitive while the 1990s is the least sensitive period.

The rest of the paper is organized as follows. Section 2 reviews the evidence on the cyclical pattern of employment, earnings and real wages. Section 3 describes the data and Section 4 describes the empirical framework. The results are presented in Section 4. We conclude in Section 5.

## *2. Previous Literature*

Prior research has examined the effect of business cycles and local labor market

conditions on employment outcomes (Bartik 1991, 1993a, 1993b, and 1996, Blanchard and Katz 1992, Holzer 1991, Hoynes 2000a), real wages (Bils 1985, Blank 1990, Keane et al 1988, Solon et al 1994), racial differences in labor market outcomes (Bound and Holzer 1993, 1995), labor market outcomes of disadvantaged youths (Acs and Wissoker 1991, Bound and Freeman 1992, Cain and Finnie 1990, Freeman 1982, 1991a, 1991b, Freeman and Rodgers 2000), and family income, poverty and income inequality (Bartik 1994, Blank 1989, Blank 1993, Blank and Blinder 1986, Blank and Card 1993, Cutler and Katz 1991, Freeman 2001). These studies almost universally find that labor market outcomes are procyclical, with greater sensitivity among lower skilled groups.

The studies of disadvantaged youths relate labor market outcomes to local (typically Metropolitan Statistical Area or MSA) unemployment rates. That literature has consistently found that higher local unemployment rates lead to reductions in employment and earnings (Acs and Wissoker 1991, Bound and Freeman 1992, Cain and Finnie 1990, Freeman 1982, 1991a, 1991b, Freeman and Rodgers 2000), with larger effects for blacks, younger workers, and less educated workers (Acs and Wissoker 1991, and Freeman 1991b).

Other studies have examined how MSAs labor market conditions impact employment and wages in the wider population (Bartik 1991, 1993a, 1993b, 1994 and 1996, and Bound and Holzer 1993 and 1995). These studies estimate the impact of the growth and changing composition of MSA employment on area employment and earnings. The results differ somewhat across the studies, but they generally show that changes in labor demand lead to larger changes for blacks, younger persons, and those with lower education levels. The patterns seem to hold for men and women.

Hoynes (2000a) examines the effect of business cycles on the employment, earnings, and income of persons in different demographic groups defined by sex, education, and race. The business cycle impacts are identified using variation across MSAs in the timing and severity of shocks. The results consistently show that individuals with lower education levels, nonwhites, and low skill women experience greater cyclical fluctuation than high skill men. The results are the most striking when examining comprehensive measures of labor force activity such as the likelihood of full-time year around work. Government transfers and the earnings of other family members decrease the differences between groups, as business cycles have more skill-group neutral effects on family income than individual earnings. The evidence further suggests that the 1992 recession led to more uniform effects across skill groups than earlier cycles.

The studies of family income and poverty have typically used either national (Blank 1989, Blank 1993, and Blank and Blinder 1986, Cutler and Katz 1991) or regional (Blank and Card 1993) variation in unemployment rates or GNP as cyclical indicators. The studies find a consistent negative relationship between unemployment rates and inequality and poverty. In particular, Blank (1989) disaggregates household income into many components and finds earnings and capital income to be pro-cyclical and some transfer income to be counter-cyclical. Overall, she finds greater variation in income over the cycle for those who are young, male, and nonwhite. More recently, Freeman (2001) used a pooled cross-state-time-series model to examine the impact of earnings, unemployment and inequality on poverty. He finds that decreases in unemployment or increases in real wages lead to declines in poverty.

As summarized in the introduction, our earlier work (Hines, Hoynes and Krueger 2001) examined data from 19906-1999 and analyzed the impact of business cycles on employment,

hours, wages, earnings, income and poverty. We also examined whether the sustained expansion of the 1990s led to different effects compared to earlier cycles. We also examined in more detail the impact of cycles by exploring whether changes in unemployment have differential impacts in booms and busts or whether the length of the current boom or bust has an effect independent of the unemployment rate.

### *3. Data and Sample*

We start with a sample of persons age 20-55 from the March Current Population Survey. The March CPS is an annual demographic file that includes labor market and income information for the previous year, at the individual and family level. The sample size is approximately 150,000 persons per year. We use data from the 1977 to 2004 CPS surveys, which covers outcomes for calendar years 1976 to 2003.<sup>1</sup> We use this “prime age” sample to minimize the impacts of early retirement and early schooling decisions.

An important issue that arises throughout this literature is whether one should use national, regional, or metropolitan area controls for business cycles. The main appeal of using the national cycle is that it is measured relatively precisely, and reflects movements in the aggregate economy. However, the principal weakness of using an aggregate cycle measure is that it may pick up the influences of unmeasured aggregate variables. Furthermore, the use of an aggregate measure of the cycle does not exploit regional differences in the business cycle. In

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<sup>1</sup> Some standard adjustments to the data are implemented. The earnings data are topcoded at \$50,000 through 1981, \$75,000 from 1982-1984, \$100,000 from 1985-1988, and about \$200,000 from 1989 on. Following Katz and Murphy (1992), the earnings of topcoded individuals are adjusted to be 1.45 times the topcoded value. Beginning in 1996, instead of giving each topcoded observation the value of the topcode, the CPS assigns the mean among the sample of topcodes (by demographic group). The earnings figures can be as high as \$600,000 in this period. We make no adjustment for topcoding in these years. There is no apparent topcoding of family earnings or family

contrast, using regional or metropolitan area variation in labor market conditions leads to a substantial increase in the size of the estimation sample. This will, in general, lead to more precise estimates and allows for the estimation of models with unrestricted time effects. The time effects control for the unmeasured aggregate variables that are a concern in the aggregate models. Furthermore, some argue that labor market outcomes are more influenced by local variables than national variables (Blanchflower and Oswald 1994, Bartik 1994).<sup>2</sup>

We follow other recent papers in the literature (for example Freeman and Rodgers 2000, Hoynes 2000a, Hines, Hoynes and Krueger 2001) by using Metropolitan Statistical Area (MSA) level data to take advantage of the substantial variation in business cycles across regions in the United States and account for time effects. Because we are ultimately interested in examining whether the responsiveness to cycles varies across groups, we form demographic groups defined by years of education (<12, 12, 13-15, 16+), race (black, nonblack), and gender. Our estimation dataset, therefore, is at the cell-level where the cells are defined by MSA, year and demographic group.

We calculate various labor market outcomes for each MSA-demographic group-year in the CPS sample. In particular, we calculate the fraction employed at some time during the year (called the annual EPOP or employment-to-population rate), and mean values for hours worked, earnings, and hourly wages. Our measure of average wages is confined to workers, while the other outcome variables do not condition on work status. We also examine family outcomes

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income. Real earnings and income are constructed using the CPI-U-X1 deflator. Amounts are in 1997 dollars.

<sup>2</sup> However, using state or metropolitan areas introduces measurement error in the unemployment rate. In fact the Current Population Survey, the main data set used in this area, is not designed for reliable estimates of smaller MSAs. All of our statistics and regressions weigh the cells by the number of observations used to create the cell averages. Another issue with using metropolitan samples is that the boundaries of these areas change (perhaps endogenously) over time and metropolitan areas do not cover the entire U.S.

including mean family earnings, income and poverty rates.

We will rely on the unemployment rate as our main measure of the cycle. The MSA level unemployment rates are available on an annual basis beginning in 1976 from the BLS Local Area Unemployment Statistics division.<sup>3</sup> In some specifications, we use indicator variables or duration variables for recession and expansion period. Instead of using the national NBER dates of business cycles, we use the timing of the cycles at the Census division level. Specifically, we assigned cycle peaks and troughs for each of the nine divisions by examining the local minimum and maximums in the division-level unemployment rates. Each MSA was assigned the cycle dates corresponding to the Census Division in which it is located.

The means of the sample are provided in Appendix Table 1.

#### 4. *Empirical Model*

A key estimation issue, one that is widely discussed in the existing literature, is whether the data should be specified as a Phillips curve or a wage curve relationship. The Phillips curve relates the *change* in the dependent variable (e.g., EPOP or log wages) to the *level* of the unemployment rate. The wage curve relates the *level* of the dependent variable to the *level* of the unemployment rate. In first differences, the wage curve relates the *change* in the dependent variable to the *change* in the unemployment rate. The wage curve specification assumes that wages and employment are higher when (or where) unemployment is low. The Phillips curve specification assumes that wages and employment are growing when unemployment is low. Because a wage curve specification has a more natural theoretical interpretation and fits the data

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<sup>3</sup> An alternative measure of the cycles is the Federal Reserve's capacity utilization rate. Unfortunately, this measure

(hours as well as wages) we use better than the Phillips curve specification, in the analysis below we estimate wage curve specifications.<sup>4</sup>

We estimate a specification that regresses the year-to-year change in outcome in a cell ( $\Delta y$ ) on the year-to-year change in the unemployment rate ( $\Delta UR$ ). In particular, we estimate equations of the following form:

$$\Delta \log(y_{jmt}) = \alpha_j + \lambda_m + \theta_t + \gamma \Delta UR_{mt} + \varepsilon_{jmt},$$

where  $y_{jmt}$  is the mean labor market outcome such as mean annual hours worked for demographic group  $j$  in MSA  $m$  in year  $t$ .  $UR_{mt}$  is the unemployment rate in MSA  $m$  in year  $t$ . The regression also includes unrestricted fixed effects for demographic group ( $\alpha_j$ ), MSA ( $\lambda_m$ ) and time ( $\theta_t$ ). The identification of the key parameter,  $\gamma$ , comes from differences in the timing and severity of cycles within MSAs.

All regressions are estimated by Weighted Least Squares, using as weights the number of observations in each cell.

#### 4. Results

The top panel of Table 1 presents the basic model estimates for the full set of individual labor market and family outcome variables. Each column presents results from a different regression. The specification is identical to the equation given in the above section—the change the labor market outcome is regressed on the change in the MSA unemployment rate and fixed

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is only constructed for entire U.S. so we cannot use this variable in the MSA level analysis.

<sup>4</sup> Blanchflower and Oswald (1994) promote the wage curve relationship. Card (1995) and Blanchard and Katz (1997) test whether wage data are more consistent with the Phillips curve or wage curve, and conclude that a Phillips

effects for year, MSA, and demographic group. The only parameter estimate provided is for the change in the unemployment rate. The EPOP and poverty rate are specified in levels, while the other outcome variables (annual earnings, hourly wages, family earnings, family income) are specified in logs.

These estimates show that labor market outcomes are strongly procyclical—an increase in MSA unemployment rates leads to a reduction in EPOP, annual hours, earnings, wages, family earnings, and family income and an increase in poverty. The coefficient in column (1) implies that a change in the unemployment rate of 1 percentage point (e.g. from 5 to 6 percent) leads to a change in the EPOP rate of -0.003 or -0.3 percentage points.<sup>5</sup> The coefficient in column (2) implies that a 1 percentage point increase in the unemployment rate is associated with a 1.5 percent decrease in average hours worked. To put this magnitude in perspective, note that annual work hours averaged 1,573 over this time period, and in the last 10 years ranged from a low of 1,587 in 2003 to a high of 1,676 in 2000. At the overall average, therefore, a 1 percentage point increase in unemployment rates would lead to a reduction in annual hours of about 24 hours—or a half a week of full-time work.

The results in columns (1) through (4) indicate that annual earnings are more procyclical than annual hours, while real hourly wages are less procyclical than wages or earnings. A one percentage point increase in unemployment rates leads to a 1 percent decrease in real annual earnings and a 0.4 percent decrease in real hourly wages. Average wages are particularly difficult to interpret when using pooled cross-section data since the mean is taken over a changing population if the composition of the work force changes over the business cycle.

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curve provides a better description of wage data.

The last three columns in Table 1 examine the cyclical nature of family outcomes. An analysis of families may differ from one of individuals in that families contain varying numbers of potential workers with differences in propensities for intra-family substitution of labor market activity. Furthermore, family income and poverty status depend on government transfers, which are strongly procyclical. The basic estimates show that, as expected, family earnings and income are strongly procyclical and poverty rates are countercyclical. Family income is less cyclical compared to family earnings, implying that adding non-labor income to family earnings significantly reduces the differences in the cyclical response. This pattern was also found by Blank (1989), Blank and Card (1993), and Hoynes (2000a), and seems to be due to the impacts of countercyclical income transfer programs such as public assistance and unemployment compensation.

The results in Table 1 are very close to the results for 1976-1999 in Hines, Hoynes and Kreuger (2001).

The bottom panel of Table 1 allows the impact of the unemployment rate to differ in recessions and expansions. We also provide the p-value for the test of equal coefficients. As explained above, the cycles are dated using the nine Census Divisions. There is a consistent asymmetric impact of unemployment in recessions and expansions—with larger impacts of changes in unemployment rates in recessions. The only exception is real hourly wages, which have a larger (but not statistically different) impact in expansions. These results imply that recessions tend to inflict a sharp amount of pain in a short period, while upswings lead to gradual improvements.

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<sup>5</sup> The EPOP is specified as a rate—the mean in Appendix Table 1 is about 0.8. So a coefficient of -0.003 is

The results in Table 2 explore how the cyclical variation varies across education groups. The change in unemployment rates is interacted with education level, with the omitted group being those with less than a high school education. The results consistently show that lower education groups (especially those without a high school diploma) are much more responsive to cycles than higher education groups. For example, an increase of 1 percentage point in the MSA unemployment rate leads to a 2.2 percent decline in real annual earnings for dropouts and only a 0.4 percent decline in real annual earnings for those with a college education or more (the main effect needs to be added to the coefficient on the interaction term).

Referring back to Table 1, in the sample as a whole, family income exhibits slightly less cyclical variation compared to family earnings (-0.013 vs -0.010). Table 2 shows that this tendency is much more pronounced for those with lower education levels. For example, among those with less than a high school education, a one percentage point increase in unemployment is associated with a 2.5 percent decline in family earnings but a 1.5 percent decline in family income, while among those with a college degree a one percentage point increase in unemployment leads to a 0.6 percent decline in family earnings and a 0.7 percent decline in family income. This would be explained by lower education groups have higher participation in counter-cyclical transfer programs. It is clear that these programs reduce the income volatility across demographic groups.

The results in Table 3 explore how the cyclical variation varies across gender and race. The change in unemployment rates with four dummies (black-male, black-female, nonblack-male, nonblack-female), with the omitted group being black males. Overall, blacks have greater

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equivalent to a -0.3 in percentage point terms.

cyclical than nonblacks and black males are the most cyclical group while white females are the least cyclical group. For example, a 1 percentage point increase in the MSA unemployment rate leads to a 1.9 percent decline in real annual earnings for black males and a 0.6 percent decline in real annual earnings for white females. For whites, women uniformly are less cyclical than men. For blacks, the pattern is not as clear. The interactions of black-female and the change in the unemployment rate are sometimes positive (suggesting they are less cyclically sensitive than black-males) and sometimes negative (suggesting they are more cyclically sensitive) yet they are rarely statistically significant.

Hoynes (2000) explored these gender differences more comprehensively and found that part of this difference could be attributed to women acting as “added workers” during recessions. They also are more likely to be employed in less cyclical industries such as public sector employment, FIRE and retail trade.

The remaining tables explore whether and how these results vary over time. Table 4 takes a first cut at this by including interactions for decade (1970s, 1980s, 1990s, 2000s) and the change in the unemployment rate, with the omitted group being the 1970s. The most recent period has the greatest cyclical sensitivity, followed by the 1970s (the omitted period), and last the 1990s.

Given the variation in coefficients over time, and with the interest in learning about the impact of cycles at turn of the millennium, we re-estimate the models in Tables 1-3 limiting the analysis to the two most recent business cycles: years 1990-2003. These results are presented in Tables 6-8. Overall, the findings are fairly robust over the recent period and compare very closely to the results for the full period. The results by race and gender show the most changes.

Comparing Table 8 to Table 3, it is clear that black males have become less cyclically sensitive in the recent period. And the differences across the race-gender groups are smaller in the more recent period. The one exception is with black females, who are now more cyclically sensitive than the other groups. This may be due to the dramatic increase in labor force participation rates of single women during the 1990s.

## *5. Conclusion*

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Table 1: Estimating the Effect of Cycles of Labor-Market Outcomes across MSAs Using the CPS, 1976-2003, Basic Specifications

	Change in EPOP	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate (Level)
A. Base Case							
$\Delta$ UR (MSA)	-0.003 (0.001)	-0.008 (0.001)	-0.010 (0.002)	-0.004 (0.002)	-0.013 (0.002)	-0.010 (0.002)	0.002 (0.001)
B. Asymmetries in effect of unemployment rate							
$\Delta$ UR x recession	-0.004 (0.001)	-0.013 (0.002)	-0.015 (0.003)	-0.003 (0.003)	-0.018 (0.003)	-0.014 (0.003)	0.003 (0.001)
$\Delta$ UR x expansion	-0.002 (0.001)	-0.004 (0.002)	-0.006 (0.003)	-0.005 (0.002)	-0.008 (0.003)	-0.006 (0.003)	0.001 (0.001)
p-value test for equal coefficients	0.069	0.001	0.020	0.621	0.0370	0.034	0.290

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families.

Table 2: Estimating the Effect of Cycles on Labor-Market Outcomes in MSAs Using the CPS, 1976-2002, Exploring Differences Across Education Groups

	Change in EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate
$\Delta$ UR	-0.004 (0.001)	-0.018 (0.002)	-0.022 (0.003)	-0.004 (0.003)	-0.025 (0.004)	-0.015 (0.003)	0.006 (0.002)
$\Delta$ UR x high school graduate	0.000 (0.001)	0.009 (0.003)	0.011 (0.004)	-0.001 (0.003)	0.012 (0.005)	0.005 (0.004)	-0.004 (0.002)
$\Delta$ UR x some college	0.001 (0.001)	0.010 (0.003)	0.015 (0.004)	0.003 (0.004)	0.014 (0.005)	0.007 (0.004)	-0.004 (0.002)
$\Delta$ UR x college graduate or more	0.005 (0.001)	0.018 (0.003)	0.018 (0.004)	-0.004 (0.004)	0.019 (0.005)	0.008 (0.004)	-0.008 (0.002)

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families. The omitted group is those with less than a high school education.

Table 3: Estimating the Effect of Cycles on Labor-Market Outcomes in MSAs Using the CPS, 1976-2003, Exploring Differences Across Gender and Race

	Change in EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate
$\Delta$ UR	-0.004 (0.002)	-0.017 (0.004)	-0.019 (0.006)	-0.007 (0.005)	-0.015 (0.006)	-0.013 (0.005)	0.003 (0.002)
$\Delta$ UR x male x non-black	0.002 (0.002)	0.010 (0.004)	0.008 (0.006)	0.002 (0.006)	0.004 (0.006)	0.004 (0.005)	-0.003 (0.002)
$\Delta$ UR x female x black	-0.003 (0.002)	0.000 (0.005)	0.003 (0.008)	0.012 (0.007)	-0.018 (0.009)	-0.001 (0.007)	0.007 (0.003)
$\Delta$ UR x female x non-black	0.001 (0.002)	0.011 (0.004)	0.013 (0.006)	0.001 (0.005)	0.001 (0.007)	0.004 (0.006)	-0.000 (0.003)

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families. The omitted group is black males.

Table 4: Estimating the Effect of Cycles on Labor-Market Outcomes in MSAs Using the CPS, 1976-2003, Exploring Differences Across Time Period

	Change in EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate
$\Delta$ UR	-0.002 (0.001)	-0.004 (0.003)	-0.009 (0.004)	-0.006 (0.004)	-0.004 (0.005)	-0.002 (0.004)	-0.000 (0.002)
$\Delta$ UR x 1980s	-0.001 (0.002)	-0.007 (0.004)	-0.006 (0.005)	0.002 (0.005)	-0.015 (0.006)	-0.011 (0.005)	0.004 (0.002)
$\Delta$ UR x 1990s	0.000 (0.002)	-0.000 (0.004)	0.007 (0.005)	0.005 (0.005)	-0.004 (0.007)	-0.004 (0.005)	0.002 (0.002)
$\Delta$ UR x 2000s	-0.001 (0.002)	-0.005 (0.005)	-0.009 (0.007)	-0.001 (0.006)	-0.019 (0.009)	-0.017 (0.007)	-0.002 (0.003)

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families. The omitted group is for 1976-1980.

Table 5: Estimating the Impact of Cycles on Labor Market Outcomes Across MSAs Using the CPS, Exploring the Role of Length of Recession/Expansion

	Change in Annual EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate (Level)
$\Delta$ UR	-0.003 (0.001)	-0.007 (0.001)	-0.010 (0.002)	-0.005 (0.002)	-0.012 (0.002)	-0.009 (0.002)	0.002 (0.001)
Duration of recession (years)	-0.001 (0.001)	-0.002 (0.002)	-0.001 (0.002)	0.002 (0.002)	-0.004 (0.003)	-0.003 (0.002)	0.001 (0.001)
Duration of Expansion (years)	-0.000 (0.000)	0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.001)	0.000 (0.001)
p-value for joint significance of duration variables	0.409	0.334	0.738	0.355	0.351	0.459	0.391

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families.

Table 6: Estimating the Effect of Cycles of Labor-Market Outcomes across MSAs Using the CPS, 1990-2003, Basic Specifications

	Change in EPOP	Change in Log Annual Hours	Change in Log Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate (Level)
A: Base Specification							
$\Delta$ UR (MSA)	-0.003 (0.001)	-0.007 (0.002)	-0.008 (0.003)	-0.004 (0.003)	-0.013 (0.003)	-0.010 (0.003)	0.002 (0.001)
B. Asymmetries in effect of unemployment rate							
$\Delta$ UR x recession	-0.003 (0.001)	-0.010 (0.003)	-0.013 (0.004)	-0.003 (0.004)	-0.016 (0.005)	-0.012 (0.004)	0.002 (0.002)
$\Delta$ UR x expansion	-0.002 (0.001)	-0.004 (0.003)	-0.002 (0.004)	-0.004 (0.004)	-0.008 (0.005)	-0.007 (0.004)	0.002 (0.002)
p-value test for equal coefficients	0.608	0.108	0.064	0.801	0.2511	0.397	0.999

Notes:

Author's tabulations of the 1991-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families.

Table 7: Estimating the Effect of Cycles on Labor-Market Outcomes in MSAs Using the CPS, 1990-2003, Exploring Differences Across Education Groups

	Change in EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate
$\Delta$ UR	-0.005 (0.002)	-0.017 (0.003)	-0.019 (0.005)	-0.002 (0.005)	-0.022 (0.006)	-0.015 (0.005)	0.005 (0.002)
$\Delta$ UR x high school graduate	0.001 (0.002)	0.007 (0.004)	0.010 (0.006)	-0.002 (0.006)	0.012 (0.007)	0.008 (0.006)	-0.003 (0.003)
$\Delta$ UR x some college	0.002 (0.002)	0.009 (0.004)	0.014 (0.006)	0.005 (0.006)	0.013 (0.007)	0.008 (0.006)	-0.002 (0.003)
$\Delta$ UR x college graduate or more	0.006 (0.002)	0.017 (0.004)	0.014 (0.006)	-0.007 (0.006)	0.010 (0.007)	0.003 (0.006)	-0.006 (0.003)

Notes:

Author's tabulations of the 1991-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families. The omitted group is those with less than a high school education.

Table 8: Estimating the Effect of Cycles on Labor-Market Outcomes in MSAs Using the CPS, 1990-2003, Exploring Differences Across Gender and Race

	Change in EPOP (Level)	Change in Log Annual Hours	Change in Log Real Annual Earnings	Change in Log Real Hourly Wage (Workers)	Change in Log Real Family Earnings	Change in Log Real Family Income	Change in Family Poverty Rate
$\Delta$ UR	-0.001 (0.003)	-0.007 (0.006)	-0.008 (0.009)	-0.010 (0.008)	-0.009 (0.009)	-0.013 (0.007)	0.002 (0.003)
$\Delta$ UR x male x nonblack	-0.002 (0.003)	-0.001 (0.006)	-0.006 (0.009)	0.004 (0.008)	-0.002 (0.009)	0.005 (0.008)	-0.001 (0.003)
$\Delta$ UR x female x black	-0.006 (0.004)	-0.016 (0.008)	-0.009 (0.011)	0.020 (0.011)	-0.017 (0.013)	0.000 (0.011)	0.006 (0.005)
$\Delta$ UR x female x nonblack	-0.002 (0.003)	0.001 (0.006)	0.006 (0.009)	0.008 (0.008)	-0.008 (0.010)	0.001 (0.008)	0.000 (0.004)

Notes:

Author's tabulations of the 1991-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). The dependent variable is the change in the (log or level) of the mean of the variable within the MSA-year-demographic cell. MSA unemployment rates are used. The model also includes fixed effects for demographic group, MSA, and year. It is a weighted regression with the number of CPS observations in the cells as the weight. The change in the unemployment rate, denoted  $\Delta$ UR, is measured as a percent of the labor force. Annual EPOP is the proportion of the population that worked during the year. Poverty rate is measured as a proportion of families. The omitted group is black males.

Appendix Table 1: Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum
<u>Undifferenced Sample</u>				
MSA Unemp Rate	5.8	2.3	0	30.8
EPOP	0.84	0.15	0	1
Annual Hours	1573	441	0	5148
Real Annual Earnings	24,149	14,529	0	340,030
Real Hourly Wage (workers)	15.52	20.69	0.008	10193
Real Family Annual Earnings	36,968	21,778	-13,566	467,044
Real Family Annual Income	40,936	22,470	-13,566	469,904
Poverty Rate	0.162	0.192	0	1
Number of persons in cell	21.9	40.6	1	561
Number of Observations	61571			
<u>First Differences Sample</u>				
Change MSA Unemp Rate	0.001	1.051	-9.2	8
Change in EPOP	-0.001	0.107	-1	1
Change in Log Annual Hours	0.001	0.219	-6.85	6.74
Change in Log Real Annual Earnings	0.006	0.320	-9.38	10.76
Change in Log Real Hourly Wage (workers)	0.006	0.284	-8.99	9.84
Change in Log Real Family Annual Earnings	0.007	0.404	-10.46	11.09
Change in Log Real Family Annual Income	0.006	0.340	-10.99	9.20
Change in Poverty Rate	0.001	0.159	-1	1
Number of Observations	57305			

Notes:

Author's tabulations of the 1977-2004 March Current Population Survey. The sample consists of persons age 20-55 with positive CPS weights. The observations are MSA-demographic group-year cells. The demographic groups are defined by RACE (nonblack, black), GENDER (male, female), and EDUC (<12,12,13-15,16+). All statistics are weighted using the number of CPS observations in the cells as the weight. Dollar amounts are in real 1997 dollars.